Appl. No. 10/616,037
Response to Office Action filed: January 13, 2010
Reply to Office Action of September 15, 2009

REMARKS

In response to the Office Action dated September 15, 2009, Applicants respectfully request reconsideration based on the amendments herein and at least the following remarks. Applicants submit that the claims as presented herein are in condition for allowance.

Claims **1**, 3-**8** and 10-20 are pending in the present application (claims **1** and **8** being independent). Claims 1 and 8 have been amended.

No new matter has been added by the amendments. Specifically, support for the amendments to claims 1 and 8 can be found at paragraphs [0036] and [0037] of the detailed description and FIG. 4, for example.

Applicants respectfully request reconsideration of claims 1, 3-8 and 10-20 based upon the amendments and at least the following remarks.

Claim Rejections Under 35 U.S.C. § 103

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that <u>all elements of the invention are disclosed in the prior art</u> and that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must <u>contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references</u>. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

<u>Claims **1, 8** and 12-20</u> are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Baba et al. (US 7,106,350, hereinafter "Baba") in view of Sato et al. (US 7,030,848, hereinafter "Sato"). Specifically, the Examiner states that Baba teaches all elements of independent claims 1 and 8 except "colors are displayed by color filters or that the first no-light display period occurs after the white light display period," which the Examiner further states is disclosed by Sato, primarily at FIG. 11d

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and columns 17, 42 and 58. Applicants respectfully traverse for at least the following reasons.

Independent claims 1 and 8 have been amended to recite, inter alia, that the frame of the image being driven by the driver is displayed by the LCD, and that the white light display period, the first no-light display period, the display period and the second no-light display period are sequentially disposed in each frame of the image.

Regarding claim 1 and Baba, Applicants respectfully note that the Examiner alleges, on page 3 of the Office Action, that Baba discloses "a first non-display period (black period and reset period in Fig. 20f within the frame period) including a white light display period (reset period in Fig. 20f; col. 16, lines 23-25) and a first no-light display period (black in Fig. 20f) during which the driver drives the LCD panel to display white light (col. 16, lines 23-25) during the white light display period then no light (black in Fig. 20f) during the first no-light display period at a different and distinct time period than the white light display period of the first non-display period (Fig. 20f)."

However, Applicants respectfully note that the reset period of Baba cited by the Examiner is disposed in the ending portion of 1 frame period (see, e.g., FIG. 20f), whereas the white light display period of the present invention, as recited in as-amended claim 1, is disposed in the starting portion of each frame of the image.

Specifically, the 1 frame period of Baba includes, in the following sequence, the black period, the image period and the reset period, whereas each frame of the present invention includes, in the following claimed sequence, the white light display period, the first no-light display period, the display period and the second no-light display period.

More specifically, in Baba, white light is used to prepare a reset signal in advance before the start of the frame (see FIG. 20F) to improve the response speed of the liquid crystal in the case of using a slow liquid crystal display ("LCD"), not to control brightness. For example, referring to column 16, lines 20-30 of Baba, "the third signal is written as a reset signal (white display in AFLC) on the high potential

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side at a previous step where the image signal, which is the first signal, is written in the pixel as shown in Fig. 20A, and, as a result, the response can be raised. Since the reset signal will write the image signal in a short term after reset, a white display is not confirmed visually regarding to the influence on the display." In contrast and in accordance with the present invention, white light is used to regulate a brightness of the display by controlling a duration of the white light display period in each frame of the image.

In addition, Applicants respectfully disagree with allegation on page 3 of the Office Action that Baba teaches that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period (Fig. 20f; furthermore Baba inherently controls the duration of the white light display period by describing a specific time period during which white light is displayed)." Specifically, Baba recites adjusting the ratio of the image display period and the black display period in order to improve the moving picture quality, and the "reset period (white display)" of Baba is used to perform resetting only, not used to control a brightness of the display. In contrast, the white light display period of the present invention regulates a brightness of the display by controlling <u>a duration of the white light display period</u>.

Thus, Baba fails to teach or suggest that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period," as recited in claim 1, nor is this deficiency of Baba taught or suggested by Sato, as discussed below.

In addition, FIG. 20F of Baba shows the voltage waveform of a pixel on a Gt-th scanning line, and thus Baba further differs from the present invention, wherein "a frame of an image driven by the driver <u>being displayed by the LCD</u>."

Regarding Sato, the Examiner alleges, on page 4 of the Office Action, that Sato discloses "a first non-display period (Ta- Tb in Fig. I11d) and a second non-display period(Tc1 - Tc2 in Fig. 11d) including a second no-light display period (Tc1 - Tc2 in Fig. 11d) during which the driver drives the LCD panel to display no light

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(clear from Fig. 11d that no light is displayed during the period; also note col. 17, lines 17-33), a driver (34-35 in Fig. 4) is configured to regulate luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods (col. 12, line 58 - col. 13, line 50, describes how the driver regulates and controls the above claimed ratio. furthermore Sato inherently controls the ratio by disclosing specific time periods for the display period and first and second no light periods)."

However, Applicants respectfully note that Sato merely discloses causing light emitting diodes ("LEDs") to sequentially emit color lights in a given cycle, and thus Sato does teach or suggest that "the driver is configured to regulate a luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods," as recited in claim 1.

Additionally, Sato fails to teach or suggest the deficiency of Baba discussed above, e.g., that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period," as recited in claim 1.

Similarly regarding claim 8, Applicants respectfully disagree with the assertion, on page 5 of the Office Action, that Baba discloses "driving the LCD panel during a first non-display period (black period and reset period in Fig. 20f within the frame period) including a first no-light display period (black in Fig. 20f) and a white light display period (reset period in Fig. 20f) to display white light during the white light display period (col. 16, lines 23-25) and no light during the first no light display period (black in Fig. 20f), and during a second non-display period (end of frame period on Fig. 20f) including a second no-light display period (end of 20f frame is black)." Specifically, the reset period of Baba cited by the Examiner is disposed in the ending portion of the 1 frame period (FIG. 20f), whereas the white light display period of the present invention, as recited in as-amended independent claim 8, is disposed in the starting portion of each frame of the image.

Specifically, the 1 frame period in Baba includes, in the following sequence, the black period, the image period and the reset period, whereas each frame of the

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image in the present invention includes, in the following claimed sequence, the white light display period, the first no-light display period, the display period and the second no-light display period.

As described in greater detail above with reference to claim 1, the abovementioned deficiency of Baba is because, in Baba, white light is used to prepare a reset signal in advance, before the start of the frame (FIG. 20F) to improve the response speed, not to control brightness, as in the present invention.

Similarly, Applicants respectfully disagree with the assertion on page 6 of the Office Action, wherein the Examiner alleges that Baba discloses that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period (Fig. 20f; furthermore Baba inherently controls the duration of the white light display period by describing a specific time period during which white light is displayed)." Specifically, as discussed above, Baba merely recites adjusting the ratio of the image display period and the black display period to improve the moving picture quality, and the "reset period (white display)" of Baba is used to perform resetting only, not used to control the brightness of the display, as in the present invention.

Thus, Baba fails to teach or suggest that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period," as recited in claim 8, and this deficiency is neither taught nor suggested by Sato.

In addition, FIG. 20F of Baba shows the voltage waveform of a pixel on a Gt-th scanning line, and thus Baba further differs from the present invention, wherein "a frame of an image driven by the driver to be displayed by the LCD."

Regarding Sato, the Examiner alleges, on page 6 of the Office Action, that Sato discloses "a driver (34-35 in Fig. 4) is configured to regulate luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods (col. 12, line 58 - col. 13, line 50, describes how the driver regulates and controls the above claimed ratio. Furthermore Sato

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inherently controls the ratio by disclosing specific time periods for the display period and first and second no light periods).

However, Applicants respectfully note that, as discussed above, Sato merely discloses causing the LEDs to sequentially emit color lights in a given cycle, but does not teach or suggest that "the driver is configured to regulate a luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods," as recited in claim 8.

Additionally, Sato fails to teach or suggest that "the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period," as recited in claim 8, and which is lacking in Baba, as noted above.

As a result, neither Baba nor Sato, either alone or in any combination thereof, teach or suggest:

> "a frame of an image being driven by the driver and being displayed by the LCD includes:
> a display period during which the driver drives the LCD panel to display a desired color by mixing a combination of light output by the plurality of color filters,
> a first non-display period including a white light display period and a first no-light display period during which the driver drives the LCD panel to display white light during the white light display period and then no light during the first no-light display period at a different and distinct time period after the white light display period of the first non-display period; and
> a second non-display period including a second no-light display period during which the driver drives the LCD panel to display no light,
> the driver is configured to regulate a luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods, and
> the driver is configured to regulate a brightness of the display by controlling a duration of the white light display period,
> wherein the white light display period, the first no-light display period, the display period and the second no-light display period are sequentially disposed in each frame of the image," as recited in independent <u>claim 1</u>; or

> "during a frame of an image to be displayed by the LCD:
> driving the LCD panel during a display period to display a desired color by mixing a combination of light output from the plurality of color filters;

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driving the LCD panel during a first non-display period including a first no-light display period and a white light display period to display white light during the white light display period and then no light during the first no-light display period after the white light display period of the first non-display period, and during a second non-display period including a second no-light display period;

regulating a luminance of the display by controlling a ratio of a duration of the display period to a duration of the first and second no-light display periods; and

regulating a brightness of the display by controlling a duration of the white light display period,

wherein the white light display period, the first no-light display period, the display period and the second no-light display period are sequentially disposed in each frame of the image," as recited in independent claim 8.

Thus, it is respectfully submitted that claims 1 and 8, including claims depending therefrom, i.e., claims 3-7 and 10-20, define over the cited references.

Accordingly, it is respectfully requested that the rejection of claims 1, 8 and 12-20 under 35 U.S.C. § 103(a) be withdrawn.

Claims 3-5, and 10-11 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Baba in view of Sato and further in view of Iwauchi (US 5,841,492, hereinafter "Iwauchi.") Specifically, the Examiner states that Baba in view of Sato teach all elements of the above-listed claims except: "wherein the plurality of color filters are transmissive color filters attached to an upper portion of the LCD panel" (claims 3 and 10); "a reflecting plate" (claim 4); or "wherein the color filters are reflective and attached to the lower portion of the LCD panel" (claims 5 and 11), which the Examiner further states is taught by Iwauchi, primarily at FIG. 1, 2a and 6, and columns 13-14. Applicants respectfully traverse for at least the following reasons.

Independent claims 1 and 8, from which claims 3-5 and 10-11 depend, is submitted as being allowable for defining over Baba in view of Sato, as discussed above.

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Furthermore, it is respectfully submitted that: "wherein the plurality of color filters are transmissive color filters attached to an upper portion of the LCD panel" (claims 3 and 10); "a reflecting plate" (claim 4); or "wherein the color filters are reflective and attached to the lower portion of the LCD panel" (claims 5 and 11), as allegedly taught by Iwauchi, or any other disclosure of Iwauchi, does not cure the deficiencies noted above with respect to Baba in view of Sato.

Thus, Applicants respectfully submit that claims 3-5, and 10-11 of the present invention are patentable over the cited references.

Accordingly, it is respectfully requested that the rejection of claims 3-5, and 10-11 under 35 U.S.C. § 103(a) be withdrawn.

Claim 6 is rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Baba in view of Sato in view of Iwauchi and further in view of Alvarez (US 5,131,736, hereinafter "Alvarez.") Specifically, the Examiner states that Baba in view of Sato in view of Iwauchi teaches all elements claim 6 except "wherein the plurality of color filters are made of photonic crystals, which are alternate arrays of dielectrics," which the Examiner further states is taught by Alvarez, primarily at column 3, lines 27-45. Applicants respectfully traverse for at least the following reasons.

Independent claim 1, from which claim 6 depends, is submitted as being allowable for defining over Baba in view of Sato, as discussed above.

Furthermore, it is respectfully submitted that "wherein the plurality of color filters are made of photonic crystals, which are alternate arrays of dielectrics," as allegedly taught by Alvarez, or any other disclosure of Alvarez, does not cure the deficiencies noted above with respect to Baba in view of Sato.

Thus, Applicants respectfully submit that claim 1 of the present invention is patentable over the cited references.

Accordingly, it is respectfully requested that the rejection of claim 1 under 35 U.S.C. § 103(a) be withdrawn.

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Conclusion

In view of the foregoing remarks distinguishing the prior art of record, Applicants respectfully submit that this application is in condition for allowance. Early notification to this effect is requested. The Examiner is invited to contact Applicants' attorneys at the below-listed telephone number regarding this Amendment or otherwise regarding the present application in order to address any questions or remaining issues concerning the same.

If there are any charges due in connection with this response, including for any necessary extensions of time under 37 C.F.R. 1.136(a) or 1.136(b), for which the Applicants hereby respectfully petition, please charge them to Deposit Account 06-1130.

Respectfully submitted,

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